

EPA Region 5 Records Ctr.



230248

CONSTRUCTION IMPLEMENTATION PLAN

SKINNER LANDFILL SITE BUTLER COUNTY WEST CHESTER, OHIO

Prepared for:

Skinner Landfill Work Group
c/o Ben Baker
2020 Dow Center
Midland, MI 48764

Prepared by:

Earth Tech, Inc.
200 Vine Street
Wilder, KY 41076

FINAL
May 2000

Project Number 38335

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1.0 SITE BACKGROUND

This Construction Implementation Plant (CIP) is prepared in conjunction with the Remedial Design for the Skinner Landfill, located in West Chester, Butler County, Ohio. This CIP addresses specific procedures that will be followed during construction activities for construction of the final cover and installation of the groundwater interceptor trench, groundwater cut-off wall, force main system and tie-in to the sanitary sewer.

1.1 Site Description

The Skinner Landfill site is located approximately 15 miles north of Cincinnati, Ohio, near West Chester, Butler County, Ohio. The site is located along Cincinnati-Dayton Road. The site is bordered on the south by the East Fork of Mill Creek, on the north by wooded land, on the east by a Consolidated Railroad Corporation (Conrail) railroad right-of-way, and on the west by Skinner Creek.

Though the Skinner property is comprised of approximately 78 acres of hilly terrain, only a portion of the site is subject to remedial action. As per the Statement of Work, the remedial action area is generally limited to a fenced area established under the December 9, 1992, Unilateral Administrative Order (UAO) relating to the first operable unit for the site. Throughout this CIP the remedial action work will refer to this fenced portion of the site.

The site is located in a highly dissected area that slopes from a till-mantled bedrock upland to a broad, flat-bottomed valley that is occupied by the main branch of Mill Creek. Elevations on the site range from a high of nearly 800 feet above mean sea level (msl) in the northeast, to a low of 645 feet msl near the confluence of Skinner Creek and the East Fork of Mill Creek. Both of these streams flow to the southwest from the site toward the main branch of Mill Creek. A third on-site stream, Dump Creek, borders the landfill on the east. Dump Creek is intermittent and flows south into the East Fork of Mill Creek. Three shallow ponds are also located on the site.

In general, the site is underlain by relatively thin glacial drift over interbedded shales and limestones of Ordovician age. The composition of the glacial drift ranges from intermixed silt, sand and gravel, to silty, sandy clays; and its thickness ranges from zero to over 40 feet on the site. The sand and gravel deposits comprise the hills and ridges and are encountered near the surface of the central portion of the site. The silts and clays usually occur as lenses in the sands and gravel or directly overlie bedrock.

1.2 Site History

The property was originally developed as a sand and gravel mining operation, and was subsequently used as a landfill from 1934 to 1990. According to EPA studies, materials deposited at the site include demolition debris, household refuse, and a wide variety of chemical wastes. The waste disposal areas include a now-buried waste lagoon near the center of the site and a landfill. According to EPA studies, the buried waste lagoon was used for the disposal of paint wastes, ink wastes, creosote, pesticides, and other chemical wastes. The landfill area, located north and northeast of the buried lagoon, received predominantly demolition and landscaping debris.

In 1976, the Ohio EPA (OEPA) initiated an investigation of the site in response to reports of a black oily liquid that was observed during a fire call to the site. Before the OEPA could complete the investigation, the landfill owners, the Skinners, covered the lagoon with a layer of demolition debris. Mr. Skinner further dissuaded the OEPA from accessing the site by claiming that nerve gas, mustard gas, and explosives were buried in the landfill. The OEPA requested the assistance of the U.S. Army after

obtaining this information. Mr. Skinner later retracted his statements concerning buried ordnance, and a U.S. Army records review performed in 1992 did not reveal any evidence of munitions disposal at the site.

In 1982, the site was placed on the National Priority List by the EPA based on information obtained during a limited investigation of the site. The investigation indicated groundwater contamination had occurred as a result of the buried wastes. In 1986, a Phase I Remedial Investigation was conducted that included sampling of groundwater, surface water and soil, as well as a biological survey of the East Fork of Mill Creek and Skinner Creek. A Phase II Remedial Investigation was conducted from 1989 to 1991 and involved further investigation of groundwater, surface water, soils, and sediments. A Baseline Risk Assessment and Feasibility Study (FS) were completed in 1992.

The Phase II Remedial Investigation revealed that the most contaminated media at the site is the soil from the buried waste lagoon. Lower levels of contamination were also found in soils on other portions of the site and in the groundwater, and very low levels were found in the sediments of the Mill Creek, Skinner Creek, the Duck Pond, and the Diving Pond. Migration of the landfill constituents has been limited, and the Phase II Remedial Investigation concluded that there had been no off-site migration of landfill constituents via groundwater flow.

1.3 Remedial Action Overview

Site remediation consists of construction of a groundwater interception system and engineered landfill cover system. The purpose of the interception system is to intercept and collect groundwater before it reaches the East Fork of Mill Creek. The groundwater interception system consists of two components. A cut-off wall will be used in areas of low hydraulic conductivity to reduce the transfer of groundwater both into and out of the site. It will consist of a low permeability soil-bentonite slurry installed from two to three feet below ground surface into the top of bedrock, creating a barrier to groundwater transport. An interceptor trench will be installed in areas of higher hydraulic conductivity that will allow relatively free flow of groundwater into and through the trench. The interceptor trench will be constructed of gravel from two to three feet below ground surface to a level approximately four feet below major sand/gravel seams. Sumps will be installed in the low points of the interceptor trench and the collected groundwater will be pumped out of the trench via a force main to the local sewer system. The trench system will roughly run parallel to the East Fork of Mill Creek, effectively intercepting groundwater flow from the landfill area.

The collected groundwater from the interceptor trench will be discharged to a sanitary sewer located on site and ultimately discharged to the Upper Mill Creek Waste Water Treatment Plant. It is anticipated that the extracted groundwater can be discharged to the sewer system without pre-treatment.

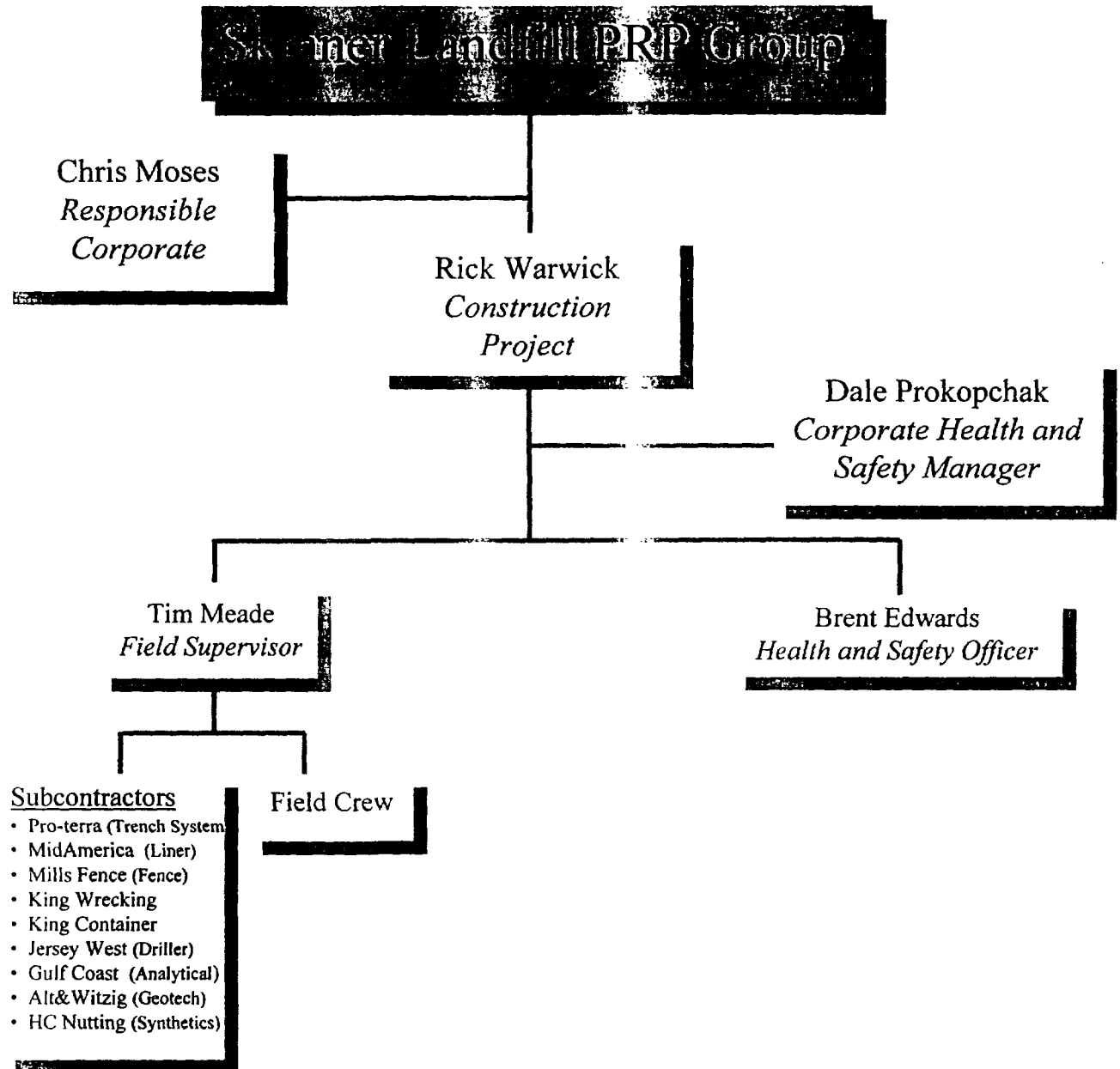
The purpose of the landfill cover system (cap) is to minimize the infiltration of water into the landfill, thereby reducing the amount of water that comes in contact with the waste. To prepare the landfill for placement of the cap, the area will be graded to the appropriate contours. After establishing the subgrade, the gas collection/vent layer will be installed. This layer will be a geocomposite consisting of a geonet between layers of geotextile. Vent pipes will be installed as part of the vent layer prior to installation of the geocomposite. The vents will consist of a 6-foot long gravel trench and perforated piping positioned just below the geocomposite layer. Fifteen gas vents will be distributed throughout the landfill. After the landfill gas collection/vent layer is installed, the secondary barrier layer will be constructed. This will consist of a Geosynthetic Clay Layer (GCL). Above the secondary barrier is the

primary barrier which will consist of a 60-mil textured Linear Low Density Polyethylene (LLDPE) geomembrane. It should be noted that the Alternative Final Cover Design is being used. Therefore, there is no 18-inch thick compacted clay layer. The 40-mil geomembrane has been replaced with a 60-mil geomembrane per the design drawings. The seams of the geomembrane panels will be welded together, and the competency of the seals will be tested prior to being covered. Geomembrane pipe boots will be installed around all planned penetrations (piezometers and gas vents) and welded to the geomembrane layer.

A geocomposite drainage layer will be installed above the primary barrier layer and will consist of a geonet between two layers of geotextile. The geocomposite drainage layer will be covered by 24 inches of soil obtained from on site sources. On-site topsoil suitable for supporting vegetative growth will be segregated for placement in the upper six inches of the soil layer, providing adequate volumes are available. The soils used in the entire soil cover layer will be suitable for protection of the underlying geosynthetics and supporting vegetative growth. The cap will be vegetated with a seed mix of tall fescues.

2.0 PROJECT ORGANIZATION

This section describes the organization of the construction project team, and respective responsibilities. The project organization chart is as shown below:



Project Team Title	Responsibilities
Responsible Corporate Officer <i>Christopher K. Moses</i>	<ul style="list-style-type: none"> • Ensure adequate allocation of personnel and equipment resources • Interface w/the Skinner Landfill Work Group Representative on a regular basis to ensure needs are being met • Review project budget and schedule • Participate in regulatory negotiations as directed by the PRP Group • Participate in community meetings as directed by the PRP Group • Visit the project site periodically to ensure schedule and resource allocation needs are being met
Corporate Health & Safety Manager <i>Dale Prokopchak, CIH</i>	<ul style="list-style-type: none"> • Preparation of Site Specific Health and Safety Plan • Develop and implement safety protocols to ensure the safety of site personnel • Technical review of site operations to identify safety concerns • Oversees the On-site Health and Safety Officer
Construction Project Manager <i>Rick Warwick</i>	<ul style="list-style-type: none"> • Assign and manage Site/Task managers • Provide monthly project reviews • Monitor weekly costs forecasts and schedules • Maintain communication with the Skinner Landfill Work Group Project Manager • Attend progress/performance evaluation meetings • Review site operations and provide technical support • Retain and manage the deployment of personnel, equipment, and materials • Implement corrective actions • Accounting and control costs • Recordkeeping and documentation • Implement quality control program • Implement comprehensive safety plan
Field Supervisor <i>Tim Meade</i>	<ul style="list-style-type: none"> • Direct work activities of multiple crews/subcontractors, to include clearing and grubbing, earthwork, waste relocation, cap construction and groundwater interceptor trench installation • Oversee implementation of the site-specific health and safety plan (HASP) • Conduct inspections of ongoing and completed work products to assure compliance with quality objectives • Schedule and direct subcontractors • Track and control project schedule and cost • Prepare submittals and invoices for Project Manager approval
Site Health & Safety Officer <i>Brent Edwards</i>	<ul style="list-style-type: none"> • Assist CIH to develop the site-specific HASP • Provide on-site health and safety oversight to include surveillance of work activities, medical monitoring, perimeter and personal air monitoring, and decontamination support • Develop task-specific risk analyses and revise site-specific HASP as necessary • Accident prevention • Coordinate with local emergency management agencies, as necessary • Conduct daily safety meetings to address planned activities

3.0 SUBMITTALS

During the course of the construction activities, various project submittals are required for the PRP Group and the Agencies. Those submittals required for the Agencies that are specifically related to the construction activities have been itemized below.

Submittal	Due date
Qualifications of Earth Tech to perform the work	N/A (Previously submitted)
Progress reports	Monthly
Construction Completion Report (Landfill cap and groundwater interceptor system)	Sixty days following completion of construction activities
Data reports	Monthly with progress reports and 60 days after completion of construction activities with the Construction Completion Report

Appendix A contains a detailed submittal log required by the specifications. The listed documents are to be used for internal purposes and for compiling the final certification report.

4.0 GENERAL SITE WORK

4.1 Mobilization

Upon authorization to proceed with field operations, Earth Tech will mobilize personnel and equipment to the site to perform site preparation activities. The specific activities that will take place are described in the following sections.

4.2 Site Set Up

4.2.1 Support Area

Earth Tech will utilize the area designated in the Remedial Design drawing 4.2 – Site Construction Use Plan for the support area. Temporary support facilities will be mobilized and installed. These support facilities will be maintained throughout the duration of field activities. The list provided herein indicates the major temporary support facilities that will be mobilized at the commencement of the project.

Temporary Support Facilities
<ul style="list-style-type: none">• Earth Tech field office trailer• Engineer's field office trailer• Storage Trailer (PPE, pumps, erosion control, etc.)• Trash Dumpster

4.2.2 Temporary Utilities

Earth Tech will install all temporary utilities specified and/or necessary to maintain the support facilities.

At a minimum, these temporary utilities shall include:

- electrical
- telephone
- potable (bottled) water
- sanitary facilities (portable toilets)
- fax

4.2.3 Decontamination Area

Personnel and equipment decontamination (decon) areas will be established in the support areas. The personnel decon area consisting of boot washes will be provided at various locations of the site depending on work activities. The equipment decon area will be located to the northwest of the field offices. The decon pad will be 40 feet long x 35 feet wide. The decon pad area will be excavated to prepare for its subsequent construction. The pad itself will be constructed of 40-mil PVC geomembrane liner, fine and coarse aggregate, non-woven geotextile filter, 24-inch diameter CSP riser with grate, portable sump pump and a waterproof cover. Decontamination water generated during decon activities will be placed on the landfill. Plywood will be used in the decon area to minimize trackout as necessary.

4.3 Site Preparation

Site preparation activities will include all necessary staging area construction, access road installation, utility clearances, delineation of work zones, installation of erosion control devices and inspections to prepare the site for remedial activities. The specific tasks that will be undertaken during the site preparation period include clearing and grubbing (both of the borrow areas and along the path intended for the trench and cut-off wall), stripping topsoil, demolition and miscellaneous surface features and relocation of scrap metal and equipment. To prepare to trench installation, a work platform will be

constructed, the diversion berm will be installed and the fence will be relocated as necessary to provide access for the trench and wall installation.

4.3.1 Clearing and Grubbing

Clearing and grubbing of the landfill (10.5) acres, the north borrow area (~5 acres) and the south borrow area (~ 2.5 acres) is required prior to construction of the landfill cap. All trees, brush and stumps removed from these areas will be temporarily located on the eastern side of the landfill or adjacent to one of the borrow areas. This debris will ultimately be placed into the larger borrow area. The trees will be piled or "wind rowed" to create wildlife habitats.

4.3.2 Access Road Construction

The main access road will be constructed on the west side of the site to accommodate heavy equipment and truck traffic. The roads will be underlain with 16-ounce woven geotextile on top of which a minimum of six inches of crushed stone will be placed and compacted. The road will be 12 feet wide and will have a 3:1 slope on the upper grade and a 2:1 slope on the down gradient side to maintain positive drainage. The road will be graded and compacted as necessary throughout the project to accommodate equipment that will traverse the roads.

4.3.3 Relocation of Existing Fence

The fence at the western end of the cut-off wall/trench area will be relocated to allow for construction activities. The relocated fence will be six feet high topped by two strands of barbed wire. The existing fence will be used to the extent possible.

4.3.4 Relocation of Miscellaneous Equipment and Debris

Various equipment, debris and abandoned vehicles that currently reside on the surface of and adjacent to the landfill will be relocated by others prior to the commencement of construction activities. A crane, bulldozers and/or end loaders will be used to relocate all equipment to an area out of the way of any impending work. King Wrecking Company is expected to perform the majority of this work.

4.3.5 Erosion Control Measures

Erosion control measures will consist of placement of approximately 4,300 linear feet of silt fence both along the bank of the East Fork of Mill Creek, proceeding north along the west side of the site and on the northern and western sides of the landfill area. Three watersheds (eastern, western and central) will be completed to promote proper drainage in accordance with the design drawings.

The gabion ditch checks will be installed in conjunction with the surface water drainage channels at the locations shown on the design drawings.

Slopes that do not receive the erosion control blanket will be monitored for erosion during the course of construction. Areas that have been eroded will be regraded with a bulldozer prior to placement of the subsequent layer or seeding.

Slopes will not be graded until just prior to deployment of the geosynthetic cover. Each day Mid America Lining Co. will inspect the area to be covered prior to deployment of any materials. Earth Tech will make repairs using a bulldozer or other suitable piece of equipment to any areas identified by Mid America. The area will either be regraded or additional material will be placed, graded and compacted prior to the deployment of geosynthetics.

Rip rap will be placed after the completion of the upgrade swales, ditches, and channels. The swales will either be lined with erosion matting or will receive rip rap. The swales and channels will also contain silt fence and gabion ditch checks to aid in keeping the rip rap from silting over. If the rip rap does become silted over during construction it will be removed and the channel cleaned of silt. The rip rap will then be put back into the channel.

5.0 GROUNDWATER INTERCEPTION/COLLECTION SYSTEM CONSTRUCTION

5.1 Approach

5.1.1 Interceptor Trench

Three separate groundwater interception trenches will be installed parallel to the planned cut-off wall. Excavation of the trenches will commence at the eastern most trench and commence towards the west. Each trench will be excavated to the specified depth (ranging from 14 to 23 feet below grade) and linearly to a distance of approximately 50 feet in order to allow placement of two panels of geotextile filter fabric along the bottom and sides of the trench. The purpose of the geotextile is to filter out fines from the groundwater than may interfere with groundwater recovery efforts.

Biopolymer slurry will be placed in the trench bottom prior to backfilling. Water to make up the slurry will be transported and off loaded into a frac tank staged near the mixing plant. It is anticipated that city water from the nearest hydrant will be used as the source of water. Excavation of additional trench sections will proceed approximately 30 feet in advance of backfilling operations with care taken not to allow backfill material to be placed within the fabric 4 foot overlap zone. As backfill is placed, extraction and observation wells will be installed. When aggregate backfill is completed, the biopolymer will be degraded by pH adjustment. Trenches will not remain open overnight. The trench system will be completed at the end of each day and proceed on the following day. Excavations that must remain unfilled overnight will be appropriately covered to restrict unauthorized access.

The slurry will be in the trench at all times to ensure the sidewall integrity of the excavation. The excavation will proceed through the slurry in the same manner that the slurry trench will be excavated. The bottom of the trench will be checked with a weighted tape on intervals no more than 10 feet. Excavated soils containing Bio-Polymer will be loaded into off road haul trucks and dumped in the landfill area to be incorporated into the subgrade soil. The geotextile will be placed through the slurry, which is always near the top of the trench. A panel of appropriate length will be cut. For example, if the trench is 15 feet deep, we would have a panel of about 45 feet in length to allow the panel to go up both sides and across the bottom, with some tail left over to be staked down at the surface. The panel will be 15 feet wide and will overlap the previous panel by four feet as required. To place the panel, the midpoint will be marked and placed across the center of the trench. Laborers on both sides will feed the panel to the bottom of the trench as the center is weighted with gravel hand placed by shovel. Once the panel is to the bottom, it is weighted with additional gravel, then stretched out and staked down at the surface pending final backfill. With the slurry at the surface, caving of the trench walls is not expected.

The typical method for introducing backfill into the trench is to excavate beyond the pay limits to create a 1:1 end slope to the bottom of the trench. The excavated slope will be used to place the initial backfill (Note that this same procedure is allowed for the slurry trench). Continued backfill slides down the slope of the previously placed backfill as described in the specifications. We note that a tremie is requested in the area of the wells also, we would prefer to pin the well into the bottom of the trench with a rebar and secure it at the surface and then allow the backfill to flow around the well. The aggregate backfill for the project is essentially one size and will not segregate, thus negating the need for a tremie.

5.1.2 Extraction Wells and Observation Wells/Sumps

During trench installation activities, three vertical well/sumps (EW-1, EW-2, and EW-3) will be installed in which the groundwater extraction pumps will be placed. Well EW-1 will be installed to a depth of 15

feet; EW-2 will be installed to a depth of 17.0 feet; and EW-3 will be installed to a depth of 23.0 feet. The well/sump casing will be constructed of 8-inch diameter Schedule 80 or SDR 21 PVC pipe. The casing will be factory slotted or fitted with well screens with 0.030 inch slots and capped on the bottom. The casing will be slotted from the elevation of the trench bottom to a distance above the bottom (as shown on the drawings). The extraction well casing will be terminated three feet below grade and will be covered with a pre-cast concrete access vault. The minimum dimensions of the vault will be four foot in diameter. The access vault will be leveled and adjusted to match the final grade. In addition to the extraction wells, nine observation wells will be installed. Earth Tech's subcontractor will perform a pump test at the completion of the project to verify system operation using the extraction wells located within the interceptor trench.

5.1.3 Cut Off Wall

A 1,300-linear foot groundwater cut-off wall will be installed following completion of the extraction trenches. The cut-off wall is intended to prevent potentially contaminated groundwater from reaching the East Fork of Mill Creek. The cut-off wall runs approximately parallel to the creek along the east and south sides of the Skinner Landfill Site. Construction of the cut-off wall will commence on the east end, proceeding toward the west. The cut-off wall will be constructed by excavating the trench to the specified depth (ranging from 10 feet to 30 feet below grade).

The soil-bentonite backfill mix ratio will be determined through a pre-project testing program. The mix ratio of the slurry is normally field determined since it varies somewhat based on water quality. The mixed slurry will have all the QC parameters specified. Under normal conditions the ratio of bentonite to water is in the range of 4.5 – 5.0%. The soil-bentonite backfill mix ratio will be determined through a pre-job testing program. Pro-Terra (Earth Tech's subcontractor) will collect a representative sample from the soil column (about 50 lbs.) and a sample of the site groundwater (about 5 gals) to perform this testing program. Geo-Solutions (slurry material vendor) will try a mix design and test the number of samples required in the specifications and provide a mix design report. This procedure takes a few weeks to complete.

The bentonite slurry, consisting of bentonite, trench spoils and water will be mixed to the specifications and introduced into the trench as the excavation proceeds to form the cut-off wall. Water to make up the slurry will be transported and off loaded into a frac tank staged near the bentonite slurry mixing plant. It is anticipated that city water from the nearest hydrant will be used as the source of water.

Elevation control at the bottom of the trench will be performed using a weighted tape and compared to the elevation of the work platform. Depth measurements will be on intervals of no more than 10 feet. Cleanup of the slurry mixing area will not be a problem. Geo-Solutions mix plant is self-contained and does not require storage ponds. The backfill will be mixed alongside the slurry trench on the upgradient side and will create a temporary sloppy condition. The majority of the soil will be used in the trench; excess can be loaded and hauled to the landfill area for incorporation into the subgrade soil.

The spoils excavated from the trench will be mixed with the bentonite slurry on the ground adjacent to the trench with a dozer, eliminating the need for a separate soil/slurry mixing plant. Trench excavation will advance ahead of the backfilling by no more than 50 feet. The initial backfill will be placed in the lead-in trench, with subsequent backfill placed in a manner which allows it to slide down the face of previously placed backfill to the bottom of the trench. Trenches will not remain open overnight. The

trench system will be completed at the end of each day, and proceed the following day. Excavations that must remain unfilled overnight will be appropriately covered to restrict unauthorized access.

In order to properly key into the bedrock as specified, the excavator bucket will be fitted with rock teeth which will facilitate penetration into the underlying bedrock. Any loose material or cuttings generated during trench construction will be removed prior to introduction of the bentonite slurry mix.

The existing East Fork bank between Stations 5+00 and 7+00 will be graded to approximately a 2:1 slope after the completion of the cutoff wall. The slope will then be covered with geotextile and 32 inches of rip rap.

5.1.4 Force Main

The force main will be installed in a separate "force main trench" that runs adjacent to and approximately six feet north of the interceptor trenches. Within the force main trench will be the following conduits:

1. 1 ½-inch diameter communications conduit
2. 2-inch diameter electrical conduit
3. 4-inch HDPE Encasement pipe containing the 2-inch HDPE leachate force main pipe

The force main trench will be advanced using a small excavator. Sand bedding will be placed in the bottom of the trench to provide cushioning for the conduits. Trench spoils (earth fill) will be used as backfill to bring the trench back to ground level. The HDPE force main will be hydrostatic tested in accordance with the manufacturer's recommendations for their product and in conjunction with the specification.

5.1.5 Utility Trench

A separate "utility trench" will be installed in which electric and telephone service will be located. The trench will be excavated from the existing telephone service termination box (500-ECD-PC6) to the existing electrical service termination (pole 678T-62E). The trench will proceed from the electrical service termination to a new service termination. Four-inches of pea gravel bedding will be used to cushion the piping within the trench. Telephone conduit will be placed within a four inch PVC pipe approximately one foot, eight inches below grade. A separate conduit for electrical service will run approximately three feet, two inches below grade. To provide additional protection for the utilities, a lean mix concrete layer will be placed in the trench, on top of which the trench spoils will be placed and compacted. Final restoration of the utility trench will entail placement of asphalt or stone, consistent with the existing driveway material or seeding.

5.1.6 Instrumentation and Control/Electrical Connection

Electrical service from the meter at the west end of the trench will be extended to the extraction wells, the flow metering and sampling vault via the conduits in the force main trench.

5.2 Equipment

The anticipated equipment for the trench and cut off wall installation is itemized in the table below:

Equipment Item	Use
Long Reach Excavator (Kamatsu PC400 LC) w/24-inch bucket	Excavate trench and cut-off wall

Boom Truck	General site work
Track End Loader	Material handling
LGP Bulldozer Loader	Backfilling trench
Water Tanker Truck	Water storage
Backhoe	Install force main trench

5.3 Materials

Materials to be used during trench and cut-off wall construction include the following:

Material	Description
CUT-OFF WALL	
Bentonite	Pulverized (granular) premium grade sodium cation montmorillonite to meet API Standard 13A "API Specifications for Oil-Well Drilling-Fluid Materials"
Backfill Aggregate	Screen size: 3-inches $\geq 95\%$ passing by dry weight Screen size No. 200 $\leq 15\%$ passing by dry weight
Water	Fresh water free of excessive amounts of harmful substances that may adversely affect the properties of the slurry.
Additives	Softening agents, dispersants, retarders or plugging or bridging agents to permit efficient use of bentonite and proper workability of the slurry
INTERCEPTOR TRENCH	
Biodegradable Bio-Polymer	<ul style="list-style-type: none"> Rantec G150 Guar
Water	<ul style="list-style-type: none"> pH between 6 and 8. Total dissolved solids < 750 mg/l. Total hardness < 250 mg/l.
Additives	<ul style="list-style-type: none"> Softening agents, preservatives, dispersants, or retarders as necessary to permit the effective use of and proper workability of the slurry.
Backfill Aggregate	<ul style="list-style-type: none"> 1-inch clean stone (washed or crushed river gravel)
Geotextile Filter Fabric	<ul style="list-style-type: none"> Woven, monofilament polypropylene geotextile
Extraction/Observation Wells	<ul style="list-style-type: none"> Eight-inch Schedule 40-PVC Two-inch Schedule 40 PVC
Access Vault	<ul style="list-style-type: none"> 4-foot diameter

6.0 LANDFILL CAP CONSTRUCTION

6.1 Approach

6.1.1 Topsoil Stripping

Topsoil that is present on the borrow areas will be stripped using bulldozers and trucks from the borrow area. Topsoil will be stockpiled in areas determined to be the most suitable for the site work. If suitable topsoil is available on the landfill, it too will also be stripped and stockpiled. Locations of the stockpiles will be determined during construction and will be designed to minimize handling. It is estimated that the upper one to two feet of soil from the north borrow area will be stripped and stockpiled for use as topsoil during restoration activities.

6.1.2 Relocation of Contaminated Soil

Relocation of the two areas of waste located near MW-38 and BP 01 & 02 will be completed prior to the start of cap construction. The estimated volume of 875 cubic yards will be excavated using a tracked excavator and placed into roll-off containers supplied by King Container for transport to the landfill area where it will be placed into the designated area. Care will be taken during excavation activities to only excavate the identified areas of waste. Once the limits of the excavation are reached, Earth Tech will conduct confirmation sampling as outlined in the RA Field Sampling Plan (FSP). Once confirmation sampling has verified soil concentrations are below trigger levels as defined in the Quality Assurance Project Plan (QAPP), the excavations will be backfilled with clean soils from the on-site borrow area.

Every effort will be taken to ensure that transport vehicles remain on clean material throughout the project. Where necessary, a temporary haul road will be constructed to provide a clean running surface across waste material. No haul truck will be permitted to leave a loading area with waste draped over the sideboards nor will waste be piled above the confines of the truck bed. Any transportation vehicle involved with the relocation of waste within the limits of waste will be decontaminated prior to removal from the waste area.

6.1.3 Passive Gas Vent and Piezometer Installation

A total of 15 passive gas vents will be installed within the cap area prior to cap construction. The vents will be constructed with 4-inch schedule 80 PVC with solvent welded pipe sections. The vents will be sealed with bentonite mixed with cohesive soil material and hand tamped around the vent pipe. A geomembrane pipe boot will be constructed around the vent pipe and welded to the geomembrane. A galvanized steel wind-driven Rotary-Turbine ventilator will be installed atop each vent pipe. Six piezometers, located in the landfill area, will be installed prior to cap placement. During installation of piezometers P-5, P-8, P-9, P-10, P-11 and P-12 careful visual observations will be made to assist in determination of the depth of waste at these locations as outlined in the Groundwater-Waste Monitoring Plan. Geomembrane pipe boots will be installed around the piezometers to ensure a water proof fit around the pipe.

6.1.4 Landfill Subgrade Preparation

The 875 cubic yards of waste material relocated from the areas designated as Area GW-38 and Area BP-01/BP-02 to the landfill area will be placed and spread in the designated area. Waste fill material will be compacted with a minimum of three passes of a bulldozer. Waste relocation and slope grading as

required on the south and the east sides of the landfill will be implemented using excavators, trucks and bulldozers. Where necessary, waste will be consolidated from the side slopes to the location shown on Figure 4.5 of the Design Drawings. In addition, to achieve the required contours, regrading using borrow will be performed. All fills required will be subsequently compacted and proof-rolled with a 10-ton smooth drum roller to provide a solid base for the liner system. After completion of the subgrade preparation, the landfill will be surveyed.

6.1.5 Gas Vent Layer

After establishing the subgrade, the gas collection/vent layer will be installed. MidAmerica Lining Co. (MidAmerica) will perform the installation of the gas vent layer. This layer will be a geocomposite consisting of a geonet between two layers of non-woven geotextile. Vent pipes stubs will be installed as part of the passive gas system prior to installation of the geocomposite.

In general, Liner/Geotextile installation will begin at the highest point of the landfill and progress downslope from there. A minimum of 100,000 square feet of subgrade will be available for cover at the beginning of each workday. This area will be inspected each morning by MidAmerica. Earth Tech will repair any deficiencies immediately. It is anticipated that this entire 100,000-sf area can be covered in one working day with the entire liner system. Layers will be terminated in a staggered pattern to allow for the welding/seaming/overlap as required.

6.1.6 Geosynthetic Clay Liner

Following completion of the gas vent layer, the secondary barrier layer will be constructed. This layer will consist of a Geosynthetic Clay Layer (GCL). The intended GCL for this project is CETCO Bentomat DN.

Installation of the GCL will be completed by MidAmerica. To install the GCL, the polypropylene side will be placed up. The mat will be positioned using care not to damage the mat edge. Any mat placed on sideslopes will be placed parallel to the flow gradient. Backfill soil will be placed on top of the mat to prevent shifting of the mat. The GCL mats will be overlapped by a minimum of six inches on each side to provide a secure seal. In the event of rain, any portion of exposed GCL will immediately be covered with plastic sheeting or approved alternate. The GCL will not be installed during rain events or in the presence of standing water.

6.1.7 Geomembrane Installation

Above the secondary barrier the primary barrier will be installed and consist of a 60-mil textured Linear Low Density Polyethylene (LLDPE) geomembrane manufactured by Agru America, Inc.. Installation of the geomembrane layer will be completed by MidAmerica. The LLDPE will be placed in accordance with the panel layout plan prepared by Earth Tech. The geomembrane panels will be oriented to the extent possible with seals parallel to the maximum slope. The LDPE panels will have an overlap of 3 inches for extrusion welding and four to six inches for fusion welding. The final overlap will allow peel tests to be performed. All geomembrane panels deployed on a particular day will also be seamed the same day. This geomembrane layer will be seamed and tested prior to being covered. Geomembrane pipe boots will be installed around all planned penetrations (piezometers and gas vents) and welded to the geomembrane layer.

6.1.8 Drainage Layer

A drainage layer will be installed above the primary barrier layer and will consist of a geocomposite consisting of a geonet between two layers of geotextile (i.e. the same material as the gas vent layer). Installation of the geonet drainage layer will be also be completed by MidAmerica.

6.1.9 Temporary Haul Road Construction

To access the landfill area after placement of the liner, a temporary haul road will be constructed on which trucks can travel without impacting the underlying liner system. The road will be constructed by importing borrow material from one of the borrow areas and placing it as needed. The locations of the temporary roads will vary as the project progresses. The temporary road will be a minimum of three feet thick and 24 feet wide.

The Caterpillar D-65LGP bulldozer, which is anticipated to be used for final cover placement operates under a working ground pressure of 4.27 psi while the articulated dump trucks, Caterpillar D-250-E's, are at 44 psi when loaded. By placing 3 feet of soil beneath the dump truck, the effective ground pressure on the liner is reduced to less than 4 psi. The maximum surface pressure rating for our liner is not defined. Earth Tech may substitute equipment for those listed above, however, at no time will the ground pressure exerted be greater than 5 psi.

6.1.10 Vegetative Cover Layer

Trucks coming from the borrow area will travel on the access road and will place cover soils atop the landfill area, but not directly on the liner. Low Ground Pressure (LGP) bulldozers will be used to push the soils to achieve the required grades and thicknesses. Every effort will be made to spread the soils upslope in order to minimize stress development in the underlying liner components during soil placement.

6.1.11 Surface Water Drainage Controls

Surface water drainage control features include:

- Eastern watershed system consisting of a perimeter swale along the east side of the landfill, an interceptor swale along the top of the southern sideslopes and a downslope flume that conveys flow from the interceptor swale to the perimeter swale.
- Western watershed system consisting of a northern perimeter swale adjacent to the Duck Pond, a perimeter swale along the west side of the landfill, and interceptor swale along the top of the south and west sideslopes, and a downslope flume that conveys flow from the interceptor swale to the perimeter swale.
- Central watershed system consists of a central drainage channel and interceptor swales at the southern slope crest that drain to a downslope flume that conveys flow to the East Fork of Mill Creek
- Southern watershed system consisting of a sheet flow off the southern slopes.

These features will be constructed in accordance with the remedial design using excavators and bulldozers.

6.1.12 Final Restoration

Topsoil will be spread over the landfill cover and the area will be hydroseeded as specified.

6.2 Equipment

The major pieces of equipment anticipated for the landfill work are itemized in the table below. Note the specific model numbers may be replaced by an "or equal" depending upon equipment availability at the time of construction.

Equipment Item	Use
CAT D6M Bulldozer	Grade flat surface of landfill; waste relocation and slope grading
CAT D259 Off-Road Dump Trucks	Haul waste from slopes
Kamatsu PC300 Excavator	Dig and load waste from slopes
Kamatsu D65P LGP Bulldozer	Place final cover soils on landfill
JD 490 Excavator	Drainage swales/ditches
Water Truck	Dust control
CAT D8 Bulldozer	Clearing
Case 580 Backhoe	Miscellaneous site work
Case 621 Loader	Material handling
Motor Grader	Fine grading landfill subgrade
CAT D3 Bulldozer	Drainage swale installation
Smooth Drum Roller	Fill compaction

6.3 Materials

Materials used to construct the landfill cap are listed in the table below. It should be noted that the Alternative Final Cover Design is being implemented. Therefore, the 40-mil geomembrane has been replaced with a 60-mil LLDPE geomembrane per the design drawings.

Material Type	Specifications
General Earth Fill	<ul style="list-style-type: none"> On-site material consisting of clean sandy clayey soils
Geonet Gas Layer	<ul style="list-style-type: none"> Skaps Industries Transnet
Geosynthetic Clay Liner	<ul style="list-style-type: none"> CETCO Bentomat DN ¹⁾
Geomembrane Layer	<ul style="list-style-type: none"> Low Density Polyethylene textured geomembrane 60-mil thickness Manufactured by Agru America ²⁾
Geonet Drainage Layer	<ul style="list-style-type: none"> Skaps Industries Transnet
Vegetative Layer	<ul style="list-style-type: none"> Clayey soil from on-site borrow areas Topsoil material suitable for grown of grass & plants from on-site borrow areas

1) Deviation from specification: Bentonite Mass/Unit Area of 0.75 lb/sf (versus 1.0 lb/sf), but same manufacturer named in the specification

2) Deviation from specification: Tear Strength of 36 versus 42; density (geomembrane) of 0.92 (versus .94) [Note: 0.94 geomembrane density refers to an HDPE Specification]

7.0 SITE RESTORATION

7.1 Equipment Decontamination

At the commencement of intrusive activities, Earth Tech will decontaminate any piece of equipment that comes into contact with the waste prior to it's being removed from the site. All equipment involved with handling waste will also be decontaminated prior to being utilized for handling of clean material.

Earth Tech will perform a gross decontamination of the equipment within the limits of waste. All of the large or loose debris will be removed at this time through the use of track spades, shovels, spud bars or other hand tools. Once the gross decontamination has been completed, the machine will be moved to the decontamination area. Once in the decontamination area the machine will be pressure washed from the top down to remove any remaining debris. The machine will be rinsed thoroughly before exiting the decontamination area and will either be demobilized from the site or put to work with clean materials.

7.2 Monitoring Well Construction

All existing wells that require abandonment will have been abandoned prior to the start of the Interceptor/Collection System or Landfill Cap and are not part of the Interceptor/Collection System or Landfill Cap construction project. Earth Tech's subcontractor will install the monitoring wells at the locations and depths shown on the design drawings after the completion of other site work within the areas of the wells. This will prevent the newly installed wells from being disturbed or damaged by heavy equipment.

7.3 Security Fence Installation

The final site security fence will be constructed after landfill and trench construction activities have been completed. The fence will be erected as shown in the design drawings. Signs will be installed on the fence at 200-foot intervals and at the gate locations.

7.4 Topsoil, Seeding Fertilizing and Mulching

Both the landfill area and borrow areas will be restored. A fertile friable loam suitable for growth of grass and plants will be used as topsoil. All topsoil is assumed to be available from on site sources. The upper 6 inches of the vegetative cover will consist of topsoil. Permanent seed mix, consisting of Kentucky 31 Tall Fescue 35%: 1-2 lb/100 SF, or Reed Canary Grass or Smooth Brome Grass and Birdsfoot Trefol: 45% (1,2,3). Fertilizer will be applied in a manner consistent with state recommendations and/or based on the results of soil testing. Mulch will be applied at a rate of 2 tons per acre within three days of completion of seeding. Following placement, Earth Tech will provide care and maintenance to all seeded areas as necessary to produce a uniform stand of grass. Deficient, damages, or otherwise unsatisfactory areas observed will be re-fertilized, re-seeded and re-mulched.

Depending upon the availability of equipment, and time of year, seeds will be sown in one of two ways, as described below.

Method 1

- a. Sow selected seed mixture by means of equipment adapted for that purpose, or it may be scattered uniformly over areas to be seeded, and lightly raked or dragged to cover seed with approximately one-fourth inch of soil.
- b. After seeding areas shall be lightly rolled or compacted by means of suitable equipment, preferably of cultipacker type when seed bed is either too loose or contains clods which would reduce germination of seed.
- c. Slopes steeper than three to one need not be rolled.
- d. Scattering seed by hand shall be done only with satisfactory hand seeders and only at such times when the air is sufficiently quiet to prevent seeds from blowing away.

Method 2

- a. Sow or spread seed by stream or spray of water under pressure operated from an approved type of machine designed for that purpose.
- b. Place selected seed mixture and water into tank, within machine, in sufficient quantities that when contents of tank are sprayed on given area seed will be uniformly spread at required rate of application.
- c. During process stir or agitate contents of tank to provide uniform distribution of seed.
- d. Place contents of tank within two hours after seed is added to tank. Seed allowed to remain mixed with water for longer than two hours shall be rejected.
- e. Do not drag or roll.

It is not necessarily the time of year that drives the selection of the seeding method but the temperature of year. The preferred method 2, hydroseeding, cannot be performed at or below freezing temperatures. In the event that weather conditions do not allow for hydroseeding, method 1 will be employed. However, unless otherwise agreed to by the engineer, seeding between October 15 and March 15 is considered to be temporary seeding. In this case annual ryegrass will be substituted for the proposed seed mixture and applied at the same rate. The permanent seed base would be established following March 15th of the subsequent year.

8.0 SCHEDULE

Upon determination of the project mobilization date, an amended schedule will be attached as Appendix B. This schedule will be prepared in Microsoft Project and will be reviewed and updated monthly. Progress will be tracked using this schedule to graphically show schedule variances.

APPENDIX A

DETAILED SUBMITTAL LOG

SUBMITTAL TABLE
SUPPLEMENT TO CONSTRUCTION IMPLEMENTATION PLAN

Name of Submittal	Description of Submittal	Volume #	Specification Number
Quarterly Site Inspection Report	After cover installation, it shall be inspected quarterly for refuse subsidence, drainage control system problems (erosion), distressed vegetation and animal intrusion. A quarterly report shall be prepared	3	Final 100% Remedial Design Report, Section 10.1, page 57.
Pre Notice to Proceed Submittals	<ul style="list-style-type: none"> • Key employee approval • Certificate of Insurance • Site Preparation and Maintenance Plan • Contractor Quality control Plan • Initial schedule • Site Security Plan • Disposal facility letters of agreements • Decontamination facility details 	3	Section 01340, Item 1.02 (B), pg. 01340-1,
Prior to Work on Site Submittals	<ul style="list-style-type: none"> • Hazardous Environment Protection Program • Health and Safety Plan • Medical certification • H/S staff names and experience • Certification of training and course outline • Contractor's Material Handling Plan 	3	Section 01340, Item 1.02 (C) page 01340-1,
Routine Submittals	<ul style="list-style-type: none"> • Field notes and measurements • Daily quality control reports • Progress meeting agenda and records • Schedule updates • Project photographs • H/S logs and reports 	3	Section 01340, Item 1.02 (D), page 01340-1,
Other Submittals	<ul style="list-style-type: none"> • Revisions to approved plans/schedules • Deviations from Contract Documents • Certificates of compliance • Record documents • Certifications of decontamination • Contractor quality control revisions • Spill notifications and cleanup plans • Utility release information • Visitor release forms 	3	Section 01340, Item 1.02 (E), page 01340-1 & 01340-2,
Submittals associated with Stormwater Discharge	Contractor shall comply with the OEPA's NPDES Storm water requirements for construction activities. As a minimum, Contractor is required to prepare, submit and comply with: <ol style="list-style-type: none"> 1. Notice of Intent 2. Storm Water Pollution Plan 	3	01560, Item 1.03 (A), page 01560-1
Submittals associated with Erosion and Sediment Control	Prepare and submit erosion control plan to Engineer: Plan shall include: <ul style="list-style-type: none"> • Limits of disturbance • Types of stabilization to be used • Location of stabilized construction entrance • Location of proposed sediment control measures • Details of sediment traps and basins and other sediment control measures • Sequence of construction as it relates to installation, phasing and removal of sediment control measures 	3	01560, Section 1.05 (D), page 01560-1

Name of Submittal	Description of Submittal	Volume #	Specification Number
Certificate of Installation Services	Where installation services are called for provide a Certificate of installation Services, stating proper adjustments have been made to equipment or system and equipment or system is ready for startup and system demonstration. Furnish 2 copies to Engineer.	3	01600, Section 3.01 (B), page 01600-3
Certificate of Instructional Services	Coordinate training for maintenance of instrumentation, equipment, and operation of instrumentation and equipment in classroom and on site as needed. Provide Certification of Instructional Services" cosigned by Owner and supplier's representative, verifying training accomplished to satisfaction of all parties. Furnish 2 copies to Engineer.	3	01600, Section 3.01 (C), page 01600-4
Certificate of Post Startup Services	After equipment/system has been in operation for least 6 months, but no longer than 11, equipment shall be inspected by manufacturer. Provide a Certification of Post Startup Services, cosigned by OWNER and equipment representative, verifying this service has been performed.	3	01600, Section 3.01 (D), page 01600-4
Piping System Test Report	<p>Prepare and submit test report for each piping system tested. Include following information:</p> <ul style="list-style-type: none"> • Date of test • Description and identification of piping system tested • Type of test performed • Test fluid • Test pressure • Type and location of leaks detected • Corrective action taken to repair leaks • Results of retesting 	3	01669, Section 3.03(A), page 01669-2
O&M Data for Systems Demonstrations	O&M Data - - submit in accordance with 01730 and Instructional Services (01600) where required for each component	3	01670, Section 1.02(A), page 01670-1
O&M Reports for Systems Demonstration	Prepare and submit report within two working days of completion preliminary tests. Also prepare and submit report within two working days of completion of 120-hour demonstration	3	01670, Section 1.02(B), page 01670-1-2
Record Documents	At substantial completion, deliver one marked up set of record documents to Owner. Accompany submittals with transmittal letter.	3	01720, Section 1.02, page 01720-1
O&M Data	Compile equipment and product data and related information appropriate for Owner's operation and maintenance for each item of equipment or product (see Section 1.03 for Form of Submittals, Section 1.04 for Contents of Data, Section 1.05 of Specific Content of Data	3	01730, page 01730
Electrical System Demonstrations	Keep log of individual electric demonstrations. Submit in accordance with Section 01340	3	01737, Section 1.02, page 01737-1
Site Preparation and Maintenance Plan	Prepare site preparation and maintenance plan to describe Contractor's procedure for adhering to site preparation and maintenance requirements as outlined in this section. Submit plan to contract Administrator for review and approvals.	3	02100, Section 1.02, page 02100-1
Compacted Cohesive Layer	<p>For the Compacted Cohesive Layer:</p> <ul style="list-style-type: none"> A. Provide list of construction equipment to be used for the placement, moisture conditioning, and compaction of cohesive soils. B. Provide a summary of construction procedures to be used. C. Preconstruction data on off-site borrow source for clay quality and quantity D. Procedure to be used to transport material to the site. 	3	02244, Section 1.05, Page 02244-1

Name of Submittal	Description of Submittal	Volume #	Specification Number
GCL Submittal	Submit product data in accordance with Section 01440	3	02245, Section 1.02, Page 02245
Erosion and Sediment Control submittal	Submit product literature data on erosion matting; description of sediment control method that will be used; silt fencing sediment control product literature data on geotextile fabric and manufacturer's installation data	3	02270, Section 1.03, Page 02270-1
Gabion Submittal	Submit the following: <ul style="list-style-type: none"> • Location of source of stone material. • Manufacturer's installation instructions. • Test results. • Material certificates. • Submit in accordance with Section 01340. 	3	02272, Section 1.02, page 02272-1
Soil Bentonite/ Slurry Trench cut Off Wall Submittals	<ol style="list-style-type: none"> 1. Soil-bentonite slurry mix design and trial mix reports, including mix proportions, density, moisture content, gradations, and hydraulic conductivity on at least four (4) samples of the proposed design mix. 2. Compatibility test result to verify that the bentonite is compatible with (not degraded by) the groundwater. 3. Specifications of the batch plant and layouts showing locations of equipment, tanks, pumps, valves, hoses and supply lines. 4. Source of all imported material, including bentonite. Shipment of materials to the site shall be accompanied by the shipper's written verification of the quality or specification of the material, a copy of which shall be retained by the Contractor. 5. Certification of bentonite quality, showing compliance with API Standard 13A 6. Certification of quality of any admixture. 	3	02395, Section 1.06, page 02395-3
Bio-Polymer Slurry & GW Trench Construction Submittals	See section for details. Items required include evidence and references from at least five projects; a Bio-Polymer Specialist; a workplan; a quality control plan; and a waste disposal plan.	3	02397, Section 1.05, page 02397-3
LDPE Submittals	See specific section regarding the details. Specific pre-installation and installation items are listed	3	02406, Section 1.02, page 02406-1
Geotextile Submittals	See specific section regarding the details. Specific pre-installation and installation items are listed	3	02415, Section 1.02, page 02415-1
Geocomposite Submittals	Submit the following: <ol style="list-style-type: none"> 1. Origins (supplier's name and production plant) and identifications (brand name and number) of geotextile and geonet used to manufacture geocomposite. 2. Specification for geocomposite which includes properties published by manufacturer measured using specified test methods. 	3	02418, Section 1.02, page 02418-1
Gas Monitoring Probe Submittals	Submit the following <ol style="list-style-type: none"> 1. Grain size curve of filter pack and fine sand filter pack seal. 2. Submit 5 days prior to drilling. 	3	02434-1, Section 1.02, page 02434-1
Crushed Stone Paving	Test results confirming that access road crushed aggregate meets the material specifications in Part 2 Submit in accordance with Section 01340	3	02511-1, Section 1.05, page 02511-1.
Manholes, Vaults and Inlets	<p>Include one copy of results of tests and certification reports with each shipment of materials.</p> <p>If manufacturer's test data is inadequate or unavailable, ENGINEER reserves right to require cores drilled for compressive strength tests.</p> <p>Submit in accordance with Section 01340.</p>	3	02605, Section 1.02, page 02605-1

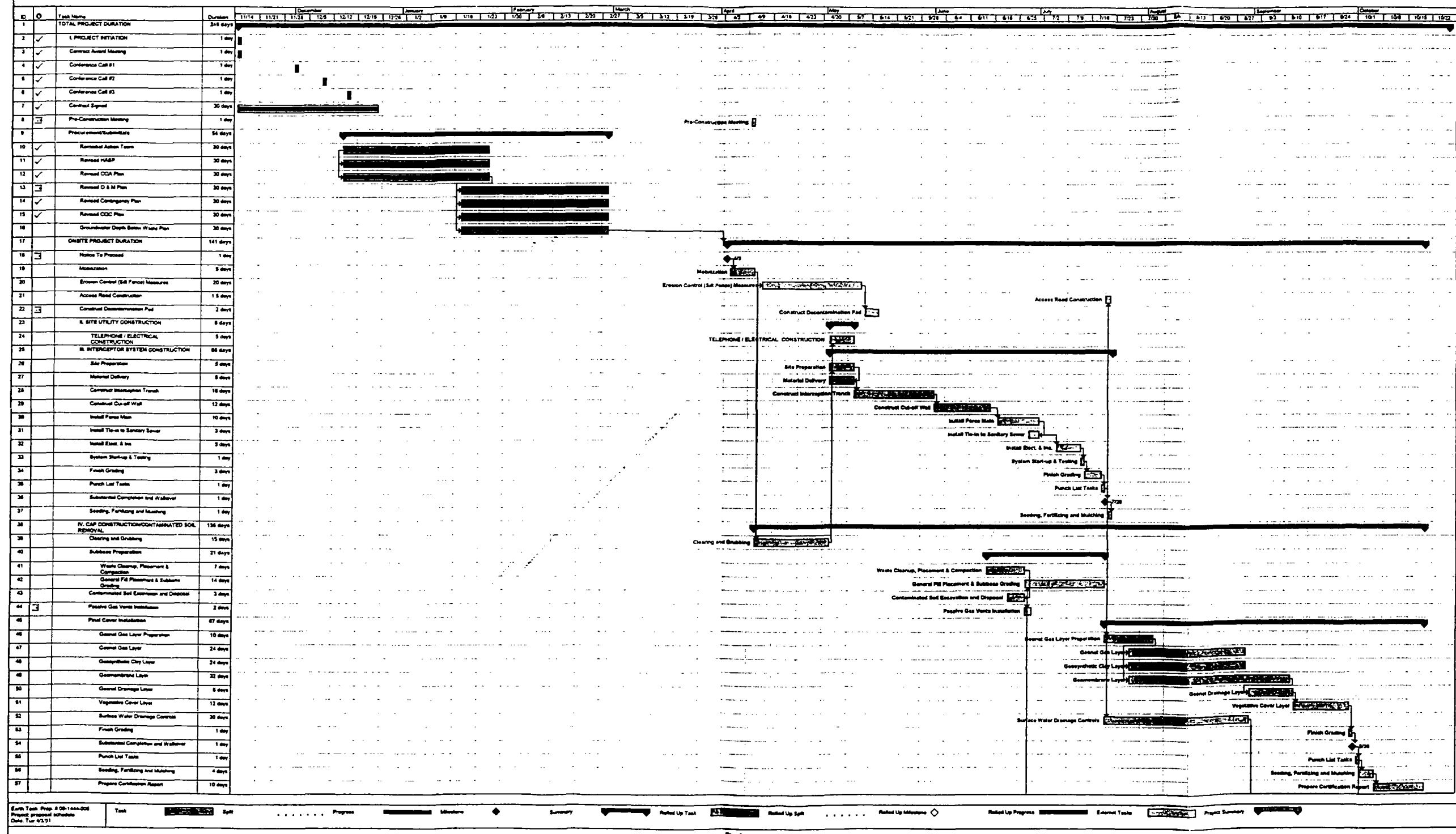
Name of Submittal	Description of Submittal	Volume #	Specification Number
Force Main System	Product Data: 1. PVC pipe and fitting certification. 2. HDPE pipe and fitting certification.	3	02732, Section 1.02, page 02605
Chain Link Fences and Gates	Product Data: 1. Fabric material. 2. Framework material.	3	02831, Section 1.03, page 02831-1
Topsoil and Seeding	Copy of soils test results including fertilizer and lime requirements before seeding work begins.	3	02930, Section 1.02, page 02930-1
Non-shrink Grout	Submit Manufacturer's literature.	3	03604, Section 1.02, page 03604-1
Vertical Pumps	A. Product data • Pump Data (see list of several items) • Motor Data (see list of several items) • Characteristic Curves (see list of several items) B. Shop Drawings C. Furnish within 30 days after Notice of Award D. Operation and Maintenance Data	3	11309, Section 1.02, page 11309-1
Flow Meter	General: If CONTRACTOR provides equipment of named manufacturer(s) without deviations submittals are not required. If CONTRACTOR is proposing substitute to named manufacturer(s), submittals below are required. O&M data is required for named and substitute manufacturers. Shop Drawings: 1. Drawing showing location of meter in pipe system. 2. Wiring diagram between meter and converter. Product Data: 1. Catalog cuts and manufacturer's specification for each meter and converter. 2. Standard wiring diagrams. Submit in accordance with Section 01340. Operation and Maintenance (O&M) Data: 1. Hydraulic calibration results including printout of actual calibration data giving indicated vs. actual flows at minimum of 3 flow rates for each meter. Identify results by serial number of each meter. 2. Submit in accordance with Section 01730.	3	13623, Section 1.03, Page 13623-1 and 13623-2
PVC Pipe	1. Submit product data for pipe, fittings, flanges, gaskets, and bolting. 2. Submit proposed gasket material for each service. Submit document confirming gasket material selection is appropriate for fluid carried in system. Submit in accordance with Section 01340.	3	15078, Section 1.01, Page 15078-1

Name of Submittal	Description of Submittal	Volume #	Specification Number
HDPE Pipe	<ol style="list-style-type: none"> 1. Manufacturing test specification data listing resin type, cell classification, stock density, melt flow, flexural modulus, tensile strength, and coloration. 2. Include test results with shipment of materials, with 2 additional copies of test results furnished to ENGINEER. 3. Pipe Dimensions: <ol style="list-style-type: none"> a. Average outside diameter. b. Average inside diameter. c. Minimum and average wall thickness. 		
Butterfly Valves	<ul style="list-style-type: none"> • Shop Drawings (In accordance with 01340) • O&M Data (in accordance with 01730) 	3	05103, Section 1.03, Page 15103-1
Check Valves	<ul style="list-style-type: none"> • Shop Drawings (In accordance with 01340) • Product Data (In accordance with 01340) • O&M Data (In accordance with 01730) 	3	15111, Section 1.01, page 15111-1
Air Relief Valve	<ul style="list-style-type: none"> • Product Data (In accordance with 01340) • O&M Data (In accordance with 01730) 	3	15122, Section 1.03, page 15122-1
Basic Electrical Materials and Methods	<ul style="list-style-type: none"> • Product Data - submit each type of product specified • Shop Drawings – detail fabrication and installation of supports and anchorage for electrical items (submit in accordance with 01340) 	3	16050, Section 1.02, page 16050-1
Electric Service	Product Data – Submit data sheets and conduit descriptions in accordance with Section 01340.	3	16401, Section 1.03, page 16401-1
Telephone Service	Product Data – Submit data sheets and conduit descriptions in accordance with Section 01340.	3	16743, Section 1.03, Page 16743-1
Instrumentation and Control	<p>A. With Bid/Proposal</p> <ol style="list-style-type: none"> 1. The contractor shall submit system descriptions and references for at least 5 similar systems in the past 3 years. 2. A listing of the equipment and the equipment manufacturer to be used in the application. 3. A statement that the manufactured items identified have been used in similar applications and references at the operation. 4. The contractor shall submit licenses required to perform the described work in the State of Ohio and Butler County. 5. The contractor shall submit a statement and supporting drawings identifying the number, size and location of the conduits required for the project. <p>B. Prior to Installation</p> <ol style="list-style-type: none"> 1. Submit the required permit applications for the system 2. Provide system diagrams for the system <p>C. After construction/prior to final acceptance</p> <ol style="list-style-type: none"> 1. A complete operations and maintenance manual 2. A statement that the system has been tested and complies with these specifications. 	3	16900, Section 1.04, 16900-2

APPENDIX B

PROJECT SCHEDULE

Earth Tech, Inc.
Skinner Landfill Remedial Action Plan Construction Schedule
West Chester, Butler County, Ohio



Earth Tech, Inc.
Skinner Landfill Remedial Action Plan Construction Schedule
West Chester, Butler County, Ohio

